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EXPANDED TECHNICAL ASSISTANCE PROGRAM

FAO Report No. 577

Report to the Government

of

ISRAEL

on

PLANT PROTECTION

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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REPORT

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GOVERNMENT OF ISRAEL

on

PLANT PROTECTION

by

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I. INTRODUCTION

Following the request of the Government of Israel for technical assistance in the field of plant quarantine, the Food and Agriculture Organization of the United Nations under its Expanded Technical Assistance Program appointed Dr. Ernst Gram, to advise and assist the Government in the organization of an effective plant quarantine system; the formulation and initiation of a program for the training of inspectors; and in the drafting of new national plant quarantine laws and regulations.

The appointment covered the period 23 October 1955 to 13 April 1956 during which time the expert served in Israel from 29 October to 11 December 1955 and from 23 January to 3 April 1956, the intervening periods being spent in Rome and Denmark for consultations.

Sincere thanks are due to all who assisted the expert during his mission and particularly to the Director-General of the Ministry of Agriculture, Mr. H. Gvati, and Messrs. R. Goodman, A. Kamm, E.G. Möir, D. Simon, and P. Spiegel of the same Ministry; the Director of the Division of Plant Protection in Jaffa, Dr. Gideon Cohen, and the staff of that Division; the Director of the Agricultural Experiment Station in Rehovot, Dr. J. Peleg, and the staffs of the Departments of Plant Pathology and Entomology; the visiting experts Dr. H. Speich (Switzerland), Dr. M.N. Levine (U.S.A.) and Dr. R.E. Wilkinson (U.S.A.); Resident Representative of UNTAB, Mr. C. Hart Schaaf, Jerusalem, and his staff; officials in the Danish Ministry of Agriculture and its institutions, Messrs. Prosper Bovien, Hans R. Hansen, H. Rönde Kristensen, K. Lindhardt, J.L. Schnicker and Halvor Skov.

II. THE STATUS OF PLANT PROTECTION IN ISRAEL

Introduction of Plant Diseases and Pests into Israel

The geographical situation of Israel offers certain advantages, sea and deserts isolating it in parts. On the other hand, there are land frontiers to countries growing similar crops. Through the centuries, this region has been traversed by important transit routes, and the considerable immigration of later years has resulted in the change of an extensive agriculture into a much more intensive and diversified use of the land. All this presents obvious dangers. Widely differing types of climate, graduated and modified in addition by irrigation, seem to offer introduced pests and pathogens more than normal opportunities.

The entomological side has recently been reviewed in FAO Report No. 151 and H. Bytinsky-Salz (in manuscript) has listed 31 species, of which 8 have proved rather serious. Introduction of parasites and predators has been attempted several times but with success in a few cases only.

As an instructive instance may be cited the polyphagous tropical fig borer (Batocera rufimaculata) from Africa or the Far East which devastated about 40 percent of the country's fig trees before promising control measures were found; the banana thrips (Hercinothrips femoralis) discovered under circumstances pointing to recent introduction with banana fruits; the black citrus scale (= Florida Red Scale, Chrysomphalus sonidum), probably an invasion by land, necessitating an annual expense of 1.5 million Israeli pounds for refined white oil; the vine phylloxera (Phylloxera vitifolii) apparently introduced with cuttings from Europe. In this last case, the distribution range (essentially northern Israel) has been surveyed and mapped and local quarantine established but the destruction of 120,000 plants and soil disinfestation has meant a loss of 60,000 Israeli pounds.

Virus diseases have been introduced in the citrus cultures, probably with budwood from America. According to observations by J.M. Wallace during a sojourn in 1955, tristeza was found in a few trees of Meyer lemon acting as symptomless carrier, but as efficient vectors were absent, this virosis fortunately has not been spread. The variety concerned, which was introduced from North America, has now been eradicated.

Of recent fungus introductions, bitter rot (Glomerella cingulata) in apple has been found in one locality, apparently favored by sprinkler irrigation; the disease is controlled by intensive spraying with Dithane Z-78 black scorch (Thielaviopsis paradoxa) of phoenix has been found once and was furthermore intercepted in an imported consignment of tillers which have been placed in post-entry quarantine.

It is most desirable that new varieties of banana, citrus and pine-apple should be imported, but the authorities responsible hesitate until reliable quarantine facilities can be provided. The lists of dangerous diseases and pests published by the European and Mediterranean Plant Protection Organization (EPPO) will in most cases apply to Israel (EPPO Report on Phytosanitary Regulations, 1955). As obvious instances can be cited wheat flag smut (Urocystis tritici), which occurs in countries along the eastern Mediterranean Sea and is a disease dispersed with straw as well as with the grains; the omnivorus Japanese beetle (Popillia japonica) and related species which are likely to be carried by air traffic; and several wood borers which cannot be detected at the port of entry unless the wood is cut. A list of diseases and pests especially feared by Israel, compiled by joint efforts, is given as an appendix to the draft ordinance concerning plant imports.

Control Measures by Public Agencies

Control operations

Of the control operations conducted by the State, those against locusts are by far the most demanding. Locust campaigns are organized and prepared in a very efficient way by quick and thorough action even when swarms arrive at unusual seasons. Reports on settling locust swarms are gathered in the late evening and treatments from the air and from the ground are carried out in the early morning.

The control of banana thrips and vine phyloxxera has already been mentioned, as well as the eradication of the Meyer lemon. Eradication likewise has been resorted to when a European consignment of wildlings was found at the port of entry to be seriously infected by crown gall (Bacterium tumefaciens). As further instances illustrating the need for public interference may be cited the citrus xyloporosis, possibly a virus disease requiring special nursery inspection but strongly influenced by varietal interaction between rootstock and budwood and by soil type; the citrus scale Pseudococcus citri which has in the last ten years by some unexplained caprice invaded vine and is probably

spread in the country by grape boxes used over and over again; the potato root nematode which will be mentioned later; and Sclerotinia laxa which has recently been found to attack branches of peach, plum, and apricot in limited areas.

Legislation

A proper Plant Protection Act is not in existence in Israel. A Plant Protection Ordinance of 1924 inherited from the period of the British Mandate is still in force. That this is an insufficient authority on which to base modern regulatory measures and control work is frequently felt in the daily administration of the problems.

Staff and facilities

The inspection staff of the Division of Plant Protection consists of eight inspectors of whom one is stationed in Jerusalem, three in Haifa (large port, airport) and four in Jaffa (ports of Jaffa and Tel-Aviv, airport of Lod). The staff is too small to perform a fully satisfactory inspection when steamers arrive with hundreds of passengers or when aeroplanes land at all hours of day and night, especially when fruit export is proceeding at the same time. Ships and their crews are not inspected at all. Passengers must declare plants and plant parts on custom's forms but customs officers are too occupied to participate in the plant inspection.

While a fumigation plant as proposed in FAO Report 151 is under construction in connection with the port of Haifa, the rooms available for inspection and for office work appear not to give the best possible conditions as to space, light, and possibilities for filing of records and specimens.

The Section of Entomology which takes care of extension work, field inspection and survey (phylloxera), public control (locusts, etc.), pests of stored products, and a part of the testing of new pesticides, has at its disposal a staff of 12 of which 7 are university or college graduates. One entomologist is stationed in Haifa, one is in charge of the Division's library, one is a specialist in taxonomy. Problems are distributed among the members of the staff according to regions of the country and groups of crops.

In the Section of Plant Pathology, extension work consumes most time, next in order come field work (post-entry quarantine, flower bulb certification) and testing of fungicides. For this, only a staff of 8 is available, of which 3 are college graduates; problems are mainly assigned according to groups of crops.

Under the Director of the Division of Plant Protection a chemist with one assistant is in charge of registration and analysis of pesticides. Fumigation problems, weed control and rodent control have one man each and three assistants are available wherever needed. The Director thus has a technical staff of thirty-six of which one-third are university or college graduates. To this must be added the necessary office staff.

Co-operation in field sanitation

Of the farmers of Israel, many are immigrants inexperienced in farming but sometimes so eager that instructors must restrain them from plunging into new practices, whereas in old farming communities, advisors rather have to fight a certain traditionalism. The co-operative methods which are so prominent in the farming communities of Israel are already playing a valuable part in pest and disease control. Co-operation may, also as a long-term measure, be made into a prominent factor in field sanitation.

An agricultural monthly journal performs a valuable service by publishing papers which, while not highly technical, are useful in keeping instructors, agricultural teachers, and intelligent farmers informed about progress and experiences. Purely technical papers are published in the international journals. Of the newspapers, one which specializes in agricultural interests is fairly willing to publish articles written by the plant protection staff; the rest of the dailies could perhaps be coerced into greater interest both in daily routine information and when real "news" is in the offing.

That the Division of Plant Protection must have free access to public broadcasting when extraordinary attacks are threatening, is a matter of course. When "Timely hints to Farmers", "Ten Minutes in Field and Garden" or similar programs are considered, it must not be forgotten that plant protection can contribute many interesting biological items which are at the same time useful to growers. If during the broadcasts it is announced that such and such a leaflet has been printed and can be obtained by sending a postcard to the Division, the requests for copies may give an idea to what extent the public has listened-in.

International co-operation

Part of the function which the staff of the Division of Plant Protection must perform is to serve as connecting link between research and regulatory work abroad. Meetings of a limited number of specialists, for the exchange of experiences concerning plant protection problems, seem to be more useful than large congresses in furthering international co-operation and early orientation in new problems. Funds for participation in such strictly technical meetings should be provided. When countries want to exchange plants and plant products, a personal exchange of viewpoints between plant quarantine officers is apt to smooth the road considerably.

III. ACCOMPLISHMENTS

New Legislation

A number of drafts have been prepared taking into consideration the International Plant Protection Convention (Rome, 1951), the recommendations of the European and Mediterranean Plant Protection Organization, and the experiences and measures of other countries in the last years. The following are to be found as Appendices at the end of this Report:

A. Draft Plant Protection Act

B. Draft ordinance concerning the importance of plants and plant products

C. Draft ordinance prohibiting the growing of certain barberries and buckthorn

D. Draft ordinance concerning plant protection arbitration

E. Draft ordinance concerning the inspection of plants intended for plating and propagation

F. Draft ordinance concerning the control of potato root nematode

G. Draft Pesticide Regulations, 1956

Draft B and related topics have been discussed with officials from the Ministry's Horticulture Division, draft C with Dr. M.N. Levine, and draft E with Dr. R.E. Wilkison in order to obtain the best possible adaptation to the status of cultivation and to give consideration to the diseases present or feared.

Danish officials have looked over the different drafts, contributing valuable suggestions; difficult points have also been discussed unofficially with other European experts.

Training

A plan has been prepared for an in-service course for plant inspectors, comprising about 14 lectures and a few excursions. The expert has contributed four lectures as a part of this course. A lecture on plant protection in Denmark was given for a larger audience, and an account of certain actual quarantine problems was presented in a closed meeting. Visual aid material for the course has been collected from several services in Europe, part as gifts.

Fellowships

A Fellowship in plant quarantine matters has been discussed with the Division of Plant Protection, and the recommendation of a candidate has been submitted to FAO.

Re-organization

In view of some difficulties experienced in the co-ordination of activities between the Experimental Station at Rehovot and the Division of Plant Protection in Jaffa, outlines of the relation between research, extension, and inspection in some European countries have been prepared. After due discussions and considerations of the existing arrangement, a schedule of possibilities of a re-organization has been proposed (Appendix H). The most important points have been elucidated in a meeting presided over by Director-General Gvati of the Ministry of Agriculture.

In Sweden, research, extension and inspection are assembled in one institution; in Denmark, plant inspection and pesticide supervision, being considered as a police activity not too compatible

with research and advisory work are carried out by agencies separate from research; in Holland, inspection and extension (together with some short-term research) form one institution, while research is concentrated in others. It appears that the three solutions are all workable. Considering the elements available at present in Israel, a re-grouping creating a strong extension unit would seem desirable. Such a unit should form the headquarters of all local extension workers and assure constant and actual connection with departments of research.

IV. RECOMMENDATIONS

General Problems

Israel needs effective quarantine measures, including inspection of imports by air and sea, supported by similar measures in neighboring states which cultivate much the same crops as Israel. Spread of pests and diseases constitutes a danger to all the countries in the region and difference in sanitary conditions between neighboring countries increases the danger even more. Some kind of group action promoting the adoption of parallel measures, therefore, is desirable between neighboring countries. FAO may act as a promoter in this respect and has already done so, e.g., by the provision of experts to several countries. It is also important that the State of Israel should bring her institutions to such perfection that they can fulfil the obligations scheduled by the International Plant Protection Convention of 1951.

A new Plant Protection Act is expected to be finalized in the near future. On this basis the ordinances now drafted should be made ready and put into force as quickly as possible.

Personnel

In order to implement the new legislation, appropriations for the training of the necessary personnel must be provided as quickly as circumstances permit. In this connection, it should be mentioned that the existing salaries appear not to be on level sufficient to attract and to keep the specialists necessary to progress. As a result, some officers may take on extra jobs, a practice which will easily cost the country more than the relatively small improvements which would prevent it. It is not too high a target that all inspectors should have college training, supplemented by special courses in regulatory items. The possibility of an easy transfer between inspection, extension and research institutions, without loss of seniority would be an added attraction; for the younger staff members such transfers would mean a widening of horizon and for the institutions an increased guarantee that every staff member was finding the place for which he was most fitted and therefore most efficient. This would, furthermore, facilitate the

occupation of the younger inspectors in quiet seasons by letting them assist in surveys, estimations of losses, preparation of reports, etc.

The number of inspectors must be increased, at least when traffic by rail and road supervene. Although difficulties may arise from combining different administrative units, some saving of manpower may be possible by bringing together the phytosanitary and the grading inspection of export fruit; to the export trade this should be an advantage as one institution can assume all responsibility for the different kinds of inspection.

It would be advisable to appoint a number of suitable persons throughout the country as "correspondents", who should receive all information published and be invited to meetings. These correspondents should be responsible for reporting the incidence of important diseases and pests in their respective areas and their assistance may be called upon during the rush seasons for inspection and related work.

Arbitration

Pest and disease attacks which cannot be considered a public danger, but which nevertheless may inflict losses, are so considerable that direct public treatment would require an excessively large staff.

A farmer neglecting the disinfection of his barley seed may cause an epidemic of net blotch (Pleospora teres) damaging barley fields of the whole district. Maize smut (Ustilago zeae) may likewise spread but proper early ensilation would destroy the fungus. Many other pests and diseases may spread from citrus varieties used for hedges, from stubble and trash not properly handled, from neglected orchards or from alternate hosts; likewise weeds may be disseminated from neglected roadsides and other areas. All such cases call for the co-operation of all growers. The same is true of prevention of cross-fertilization in seed-production and of prevention of injury from drift of weed-killers of hormone type.

Judging from experience elsewhere, the formation of local arbitration courts - with progressive and intelligent growers as arbiters - is likely to be a valuable instrument for quick and cheap settling of disputes and for gradually developing a practical use-and-custom status. Arbitration therefore has been included in the draft ordinances. It may be necessary at the beginning to let the parties select arbiters themselves, while the senior arbiter (chairman) could be appointed officially on the basis of nominations made by the growers' organizations.

In-port Inspection

A rigid and unexpected phytosanitary inspection of the luggage of tourists arriving in ports and airports may strongly counter the endeavor to attract tourists to Israel. It is proposed, therefore, to prepare a small and attractive folder, with pictures of a few important pests or diseases and with a short text in three or four languages, explaining why fruits, etc, are not welcome and must sometimes be detained for inspection. The inspection itself, while by no means superfluous, should be carried out smoothly and if possible it should be finished at the same time as the customs' examination. When plants must be detained for inspection, they should be returned free of charge and with a "Thank you for your co-operation" card attached.

Post-entry Quarantine

When the new regulations are distributed to all countries by FAO and the European Plant Protection Organization (EPPO) it can be expected that the numbers of plants arriving without proper certificates will decrease. There will, however, remain instances when ocular inspection, and possibly fumigation, is considered insufficient and when plants must be grown under supervision to ascertain that they are disease-free. This applies in particular to plants imported for trade, i.e., plant material necessary to plant breeders, geneticists and other scientists. Frequently, certificates may not accompany those shipments or they may be of doubtful value. The Division of Plant Protection should in such cases assist the importers in every possible respect.

At least two isolated quarantine areas representing Mediterranean and sub-tropical climates, securely fenced, should be available together with access to a greenhouse where temperature, moisture and light can be controlled so as to produce the conditions which will permit recognizable symptoms to develop.

When it is desired to develop new cultures, a rather large import of rooted plants, cuttings, etc. may be needed, although that may be risky from a phytosanitary viewpoint (phylloxera on grape cuttings, virus in rootstocks, tillers and budwood). One solution is the point-of-origin inspection, a measure already practised in some countries even in routine trade, in order to prevent losses resulting from the refusal of consignments after arrival in the country. If the importer cannot bear the cost of point-of-origin inspection, the quantity may be reduced and the plants put in post-entry quarantine.

For import from other continents of materials for breeding or other experimental uses it would be very desirable to have in Europe two intermediate quarantine stations, one for the North and West and one for the Mediterranean countries (Ernst Gram, Annals of Applied Biology, 42: 76-81, 1955).

Field Inspection of Nursery Stock

Due to the rapid progress in agriculture in Israel, field inspection during the growing season is already required for certain nursery plants and bulbs intended for export. For a continued and increasing production of export fruit it is essential that nursery stock planted in orchards and vineyards fulfil all reasonable claims to freedom from disease, to true variety, etc. It will probably be necessary that a plant pathologist and a specialist in varieties carry out the inspection together until they have taught each other what to look for; the responsibility for inspection and issue of certificates should be centered in one office even if specialists from other institutions must be consulted.

The expense of field inspections will be considerable although they may in due time be recovered by fees for inspection and certification. The growers will eventually recognize the benefit of field inspection which will induce timely control and prevent losses.

As a check on the inspection work, samples of bulbs, etc. presented for export inspection may be placed in control fields; these will also furnish good evidence in case of complaints.

In connection with general nursery inspection, a more intensive regulation of mother trees for budwood is needed; where the rootstocks are propagated vegetatively their source also must be supervised. To such pedigree inspection assistance from virus specialists and experts in varieties will be necessary but, again, one institution should assume the responsibility. Selection of citrus mother trees free from psorosis is well on the way in Israel, although not yet fully utilized by all nurserymen. The possible existence of Pierce's diseases in grape vine, of astcroid spot in peach, of green bud in gladiolus (observation by J.M. Wallace in 1955) and of sunblotch in avocado, point to the desirability of pedigree inspection. Appendix E comprises regulations for plant propagation and inspection, relating to the home market and also to export; Appendices F and G, which are translations of Danish rules for general inspection and for pedigree work, are patterns only which must be modified according to local conditions.

Production of Disease-free Seed

It has been mentioned in FAO Report No. 190 that lucerne for seed production might be a suitable cash crop in Israel. The climatic conditions might be favorable also for the production of other varieties of seeds (e.g., pea, bean, lupin, celeriac) which are difficult to produce free from fungus infection in the moist summer climate of north-western Europe. The type of farms common in Israel also should be suitable for crops which require personal supervision. By means of field inspection, freedom from the commonly feared seed-transmitted fungi, bacteria, and virus could be ascertained. Considering that extended new areas are being cultivated the distribution of different varieties to avoid cross-fertilization should be less difficult than in old agricultural communities. In order to retain the advantage of a dry atmosphere which reduces infection, sprinkler irrigation should probably be replaced by surface irrigation in seed fields. Surface irrigation which may require initial investments for levelling, will on the other hand save expenditure on pipes. The problem exists also in orchards where fungi apparently are favoured by the saturated atmosphere created by sprinkling. Insect pests are also influenced markedly, for instance, observation and control of the olive fly by protein baiting is possible only in dry air. Aggravation of potato late blight by sprinkling is indicated by L. Reichert (Sympos. Biol. Deserts. London 1954).

The research on seed germination promoted by the Department of Plant Physiology of the Hebrew University may contribute considerably to the understanding of high-quality seed production.

It is recommended that seed production for export be considered by the concerns already handling seed growing for domestic use, that a market analysis be undertaken, and that production of the seed varieties found saleable abroad be made the object of field experiments. Field inspection must cover health, purity of strain, freedom from certain weeds, and exclusion of cross-fertilization. The inspector, therefore, must know both the varietal characters and the relatively small number of diseases to recognize. A post-harvest examination of the seed will comprise the common seed testing for germination and purity, to which may be added the recognition of a very limited number of diseases which are visible at this stage. All applications for field and laboratory examination should be directed to the Division of Plant Protection which may, as a prerequisite for production of phytosanitary certificates, delegate post-harvest examinations to the seed-testing laboratory at Rehovot.

Disinfection of Citrus Fruit

This is desirable from a general viewpoint of good quality. Moreover, it is required by certain importing countries. The problem already has been the object of successful experiments resulting in practical application (A. Greenberg, K. Polazek, and J. Peleg. Bull. Entom. Res. 46: 803 1956). It is hoped that extensive experiments can be carried on, utilizing fully the facilities which will become available when the Experimental Station at Rehovot/Beit Dagon and the Division of Plant Protection join forces.

Laboratory Inspection

It will be natural to add to work of this type the determination of intercepted disease and pests, for which task a taxonomist specializing in entomology and another specializing in fungi will be needed. Co-operation with the taxonomists of the Hebrew University should be secured. A reference collection specially prepared for the use of inspectors should be formed, comprising prepared specimens of such pests and diseases as are the object of regulatory measures or which are feared, and also color slides, photographs and information on their biology. Courses for new inspectors and refreshor courses will most naturally be arranged by this section, with assistance from extension and research workers.

Testing of Pesticides

A good deal of the testing of new pesticides and of the supervision of the quality of pesticides distributed in the country is routine work, which under present conditions takes a good deal of the time of the Sections of Entomology and Plant Pathology. When a re-grouping of the tasks of the Division of Plant Protection is considered, it may be found most rational to gather the responsibility for pesticide testing (whether in laboratory or in field) at one center. When it comes to testing pesticides of entirely new types, assistance from the Experiment Station may be necessary. The pesticide section must also be in constant touch with the extension workers concerning both the general advisory work and arrangements for local demonstrations of chemical control.

If field testing of pesticides is amalgamated with registration and chemical testing, it may be natural to group the work on herbicides and the chemical treatment of stored products in the same unit.

Extension

The plan worked out by the Ministry of Agriculture for re-organization of the entire agricultural extension work, creating twelve district extension offices, most of which will include on their staff an advisor in plant protection, appears very promising from the plant protection viewpoint. Judging from experience elsewhere it must be expected, however, that the re-organization will involve a greatly increased demand for advice and that some district offices will soon find that two advisors in plant protection are necessary.

Until the plan is realized in full, it is considered urgent that branch offices of the institution in Jaffa be established in the north and in the south (e.g. in Haifa and Ashkelon), each with a full-time senior and junior staff member with good training. As it is important both that growers become accustomed to finding branch offices open and that the advisors regularly visit farms in their district, a certain rotation between office work and travel must be established from the beginning.

Extension (diagnosis and advisory work) is at present an essential part of the daily duties of the Sections of Entomology and Plant Pathology, with control experiments and field inspection as secondary tasks. When a re-grouping is considered the main part of the two sections should form a central extension office with at least 4 officers with broad training and experience (aside from the 4 men in the branch extension offices). Apart from the different types of extension activities already going on, the central office will be in charge of preparation of leaflets, demonstration material (charts, mounts, lantern slides, films) for use by the Division of Plant Protection and for loan to instructors.

As soon as the necessary appropriations and staff members can be secured, surveys, estimation of losses and warning services should be organized.

The central extension office will give the local extension men the necessary assistance in solving new problems which always will appear in extension work. An important task of the extension office

is to create constant liaison with the research departments, equally stimulating to both sides. As the departments move from Rehovot close to Jaffa, the improved possibilities for contact should be fully utilized.

Surveys

While the pest and disease situation in citrus plantations is the object of a regular survey, the same is not true of other crops. Inspectors, agricultural teachers and instructors of different types might be induced to complete monthly questionnaires and otherwise report on striking and important incidence. The notes of the regular staff would, of course, constitute the main source of information. To get the monthly report finished quickly it must be written by at least four persons. The monthly reports naturally form the base of an annual report which will also be of interest abroad. Direct information to the press should be given when news is really pressing.

Systematic surveys of individual pests or diseases are well known in Israel insofar as the mapping of the distribution of the vine phylloxera, an undertaking which deserves to be followed up. The other task requiring immediate attention appears to be a survey by soil examination for cysts to determine the distribution of the potato root nematode hitherto found in one premise only. Information of this kind may be required by countries importing plants from Israel. The value of a survey is dependent on reliable sampling work. The plant inspectors as well as local instructors might assist in quiet seasons or, on occasions when many samples are wanted in a short time, temporary assistants might be employed. For the examination of a considerable number of soil samples a special laboratory must be arranged with access to the services of a nematode specialist who may be consulted on aberrant and doubtful cysts which will be found frequently.

A draft ordinance concerning the potato root nematode has been designed to permit its gradual enforcement as necessity requires and as appropriations and staff are made available.

Vicinities of ports and airports, in spite of efficient inspection of imports, are immediately exposed to introduction of pests and diseases. The surroundings, therefore, ought to be searched frequently. Taxonomists, collectors and other interested persons might be induced to participate regularly in such investigations. Areas exposed to infestation by land should also be the object of a similar vigilance.

Estimation of losses as well as the cost of pesticides and control has been made in Israel in citrus plantations. Insecticides to combat black scale (Chrysomphalus sonidum) alone amounted to 2,5 million Israeli pounds annually. A relatively small appropriation for the estimation of losses in all other important crops may be very remunerative, showing where research should be intensified, providing a solid base for priorities. Estimation is only in recent years developing into an exact science, gradually replacing personal judgments.

Warning Service

In several countries warning services have been established against the late blight (Phytophthora infestans) of potatoes and tomatoes. After some years' observation, the appearance of disease can be corrolated with meteorological factors (including microclimates) and epidemics may be predicted with considerable success. In France, the forecasting of mildew attacks in vineyards has saved immense amounts of spraying work.

In Israel, observations on the seasonal occurrence of the Mediterranean fruit fly are being made by means of traps in about 40 localities. Whether the 10-12 sprayings now found necessary against codling moth could be reduced by systematic observations of hatching should be investigated. A parallel problem exists in Lebanon citrus culture according to H. Chapot (Etudes Agron. Libano-Françaises I: 79.1954). In Denmark, pear growers have learned, by means of private hatching-boxes, to time the spraying against pear gall midge (Contarinia pyrivora). In some cases such transfer of responsibility from public institutions to the individual growers may be preferable.

Considerable injury is caused by late blight in tomatoes in the Jordan valley where planting at consecutive dates and irrigation by sprinkling create very favorable conditions for the fungus. A simple system of warning based upon reports of first attacks by a number of observers which might help the effects of weather factors on the development of the disease would be a suitable topic for research. The promising development of cotton and sugar beet culture probably will raise corresponding needs for a warming service.

Research

It is outside the scope of this report to survey the research institutions which are, however, of fundamental importance to the progress of plant protection. Inspectors and extension workers must be able to consult research specialists in difficult matters and to invite them occasionally to participate in courses. First of all, inspectors and extension workers must be kept à jour with the problems which are the object of planned experiments and long-term research; on the other hand they will, from their contact with practical agricultural conditions, be able to point out problems in need of thorough investigation.

The following research problems arising from regulatory items may be suggested:

1. Ecological investigations: Holland has found it necessary to determine whether the San José scale was able to overwinter in the country; in Denmark, the same problem arose with the Colorado beetle. In Israel, it would be valuable to investigate, if safeguards could be provided, whether the San José scale or certain species of red spiders would be likely to become established, if imported.

2. The effect of sprinkling irrigation on insects and fungi.

3. Cold-storage and heat-treatment on rotting of citrus fruit - both types of treatment are extensively used as safeguards in fruit import to U.S.A.

4. A development of virus research is needed to support pedigree work in citrus propagation, in flower-bulb production, etc. Experimental production of symptoms of deficiencies, viroses and hormone injuries should be undertaken in important crops with the object of assisting advisory work and field inspection.

5. Collecting, breeding and testing of disease resistant varieties; cereals resistant to rusts and nematodes, maize to smut, tomatoes and potatoes to late blight, sugar beets to Cercospora, cotton to Verticillium.

6. Experiments in disease and pest control in part should deal with problems of a more general nature, and attention should be paid to biological and ecological factors when testinge new pesticides.

APPENDIX A

DRAFT PLANT PROTECTION ACT

An Act to prevent the Introduction and Spread of Diseases and Pests Destructive to Vegetation

Article I. Title of Act

This Act may be cited as the Plant Protection Act.

Article II. Scope

In order to prevent economic losses during production, storage, distribution and export of plants and plant products the Minister of Agriculture is authorized to issue ordinances concerning control of plant diseases, pests and weeds by means of public and private control measures, including inspection of plants and plant products, whether imported or offered for export, and inclusive of inspection of crops.

Article III. Arbitration

1. In order to prevent damage spreading or threatening to spread from premises in which injurious diseases, pests or weeds occur, or in which certain plants are growing or chemical treatments taking place, the Minister of Agriculture is authorized to issue ordinances establishing arbitration courts to decide on measures which may reasonably be enforced in order to prevent significant losses including, in cases of inordinate neglect, payment of damages and payment of the costs of arbitration.

2. An arbitration court may, if necessary, refer the execution of its decision to the public authorities.

3. The Minister of Agriculture may appeal to a superior court against the decision of an arbitration court.

Article IV. The Plant Protection Service

In order to carry out the measures herein enacted the Mi. ter of Agriculture is authorized to establish a Plant Protection Service exercising the following functions and providing the following facilities:

1. Plant Inspection including proceedings necessary for the granting of Phytosanitary Certificates and other documents which are required by importing countries or by regulations of this country, and including measures necessary in order to permit plant import without undue introduction of dangerous diseases and pests.

2. Survey of plant diseases and pests, including publications of reports on incidence and economic importance.

3. Extension, including advice to growers concerning economic control of diseases and pests, and, for the most injurious attacks, facilities for a special observation and warning service.

4. Control of sudden and destructive attacks which cannot be dealt with by the occupiers* of plants and premises.

5. Testing, approval, and supervision of pesticides offered, sold or distributed in this country.

6. The functions mentioned and any other functions may be carried out in co-operation with other public institutions or with recognized private organizations, when approved by the Minister of Agriculture.

Article V. The Plant Protection Board

In order to advise the Minister of Agriculture concerning regulations and practice in plant protection work the Minister is authorized to appoint a Plant Protection Board, consisting of an equal number of

1) specialists from research and plant protection institutions and

2) representatives from agricultural, horticultural, and sylvicultural production and export, with an officer from the Ministry as chairman and with an officer from the Plant Protection Service as secretary.

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* See "Definitions", Section 2 of "Ordinance concerning Importation of Plants and Plant Products".

Article VI. Financial Decisions

The Minister of Agriculture may, in conjunction with the Minister of Finance and with the due approval of the Parliament, order the following financial measures to be taken in connection with plant protection.

1. Assignment of compensation to such occupiers of plants or plant products who are suffering to an inordinate degree through no fault of their own as a result of proceedings taken under this act.

2. Assignment of the amounts necessary for public control of sudden and destructive attacks which cannot be dealt with adequately by the occupiers.

3. Determination of salaries of inspectors who are not government officials.

4. Determinations of fees for testing of posticides and for inspection work requested by producers, exporters, importers, and others.

Article VII. Rights and Responsibilities of the Plant Protection Service

1. The inspectors of the Plant Protection Service may enter any premises, lands, nursery, train, ship, aircraft, vehicle or other carrier, and storehouses and other buildings, where there is reason to believe that any dangerous disease or pest is or may be present, or where there are plants which may prevent the successful control of any dangerous disease or pest. No person shall obstruct an inspector in the entering of premises or the performance of examinations required to fulfil the ordinances of the Minister of Agriculture in connection with this Act, and no occupier shall refuse to assist in such examinations or in public measures of control, involving plants, land, or premises occupied by him when made under said ordinances.

2. Every occupier shall carry out such control measures of which he is notified in compliance with ordinances of the Minister for prevention of the spread of dangerous attacks. The notification may, if necessary, be given by registered letter or by public announcement from the Service.

3. The Service does not accept any economic responsibility in connection with approval or rejection of plant products inspected.

Article VIII. Violations

1. It is the duty of the Police, the Customs Authorities, and the Public Transport Agencies to assist the Plant Protection Service in investigations of suspected violations of this Act or its dependent ordinances.

2. In cases of attempted violations of this Act and of its dependent ordinances the Plant Protection Service has the right to enforce the necessary measures, to prevent removal - contrary to orders - of plants, packing material or other matters concerned, and to ensure that orders are not neglected in any other way.

3. In cases when the occupier neglects to carry out control measures which he has been instructed to apply in accordance with this Act and dependent ordinances, the Plant Protection Service shall enforce the carrying out of the measures. The Minister is entitled to recover the expenses incurred in carrying out such measures, his claims taking precedence over all other claims. In cases of serious violation, plants and plant products may be seized and destroyed or in any other way disposed of without any compensation.

Article IX. Coming into Force

This Act shall come into force..... At the same date the Plant Protection Ordinance of 1924 and dependent orders and regulations are revoked.

Article X. (A final article may be added to make a provision for amendments..... to be made by legislative action when needed.)

APPENDIX B

DRAFT ORDINANCE CONCERNING IMPORTATION OF PLANTS AND PLANT PRODUCTS

In pursuance of the Plant Protection Act of..... the following provisions are laid down in order to prevent importation of dangerous diseases and pests.

Section 1. Title

This Ordinance may be cited as the Plant Import Ordinance.

Section 2. Definitions

In the execution of this ordinance the following terms shall mean:

DANGEROUS: Such injurious diseases and pests as the Minister declares to be dangerous.

INJURIOUS: Such plants (bacteria, fungi and other plants) and such types of virus which may cause appreciable diseases in plants.

Such nematodes, insects, mites, molluscs, and other invertebrates which check or prevent the growth of plants, or devour plants, or which favor the incidence of plant diseases.

Such rodents which devour plants and plant products, and weeds and weed seeds.

INSPECTOR: An officer belonging to the Plant Protection Services, or to institutions co-operating with the Service, and who derives his authority from the Plant Protection Act and this ordinance or other ordinances based on the same Act.

INSPECTION: An examination prescribed in this ordinance and carried out by an inspector belonging to the Plant Protection Service of Israel or an examination by a duly authorized officer of the Plant Protection Service of an exporting country.

FIELD INSPECTION: An inspection of a crop or plants at their origin, at such periods when the diseases and pests concerned are most visible.

MINISTER: The Minister of Agriculture of Israel.

OCCUPIER: Any person or institution (owner, grower, consigner, consignee, importer, agent or broker) in actual possession, care or custody of the plants or plant products concerned.

ORIGIN: The locality where the plants or plant products concerned were grown or produced. In Phytosanitary Certificates, the origin may be indicated in the following way:

Seed potatoes, provided each container is marked with the growers number: The STATE.

Nursery plants, provided each tree or each bundle or package of trees and other plants is marked with the nursery's name or number: The STATE.

Table potatoes, flowers, bulbs, fresh fruits, and seeds, provided each box, bag, or other container is marked with the name and address of the firm responsible for grading and packing: The STATE.

An exporting country may choose to indicate a smaller unit, such as province, township, premises, or other well-defined locality.

Origin of nursery plants is a locality in which the plants were last grown for not less than a full season of growth; if, later, plants were grown or heeled in for less than a full season the marking must indicate number or name of such locality as well.

ORIGIN FREE FROM: A country in which the dangerous diseases or pests in question have not been observed. However, in the following cases it shall be sufficient if the origin is situated at the distance indicated below from any farm, garden, or other locality where the disease or pest is found and established:

Potato wart	5	kilometers	during	the	last	12	years
Potato root nematode	5	-	-	-	-	2	-
Colorado beetle	5	-	-	-	-	2	-
San José scale	5	-	-	-	-	2	-

PERMIT: A declaration from the Service to Customs Officials, releasing plants for import as far as Plant Protection is concerned.

PHYTOSANITARY CERTIFICATE: A certificate as prescribed in the International Plant Protection Convention (Rome, 1951), duly filled in and signed by a person authorized by the Service of the exporting country.

PLANTS: All living plants and plant parts, including trees, shrubs, tubers, corms, bulbs, rhizomes, roots, layers, cuttings, scions, budwood, fruits, vegetables, and cut flowers and branches and also including such seeds (and fruits commonly called and used as seeds) which are specially mentioned in Section 10 of this ordinance.

PLANT PRODUCTS: Material of plant origin, unless a process of manufacture has eliminated or substantially reduced the likelihood of its transmitting diseases or pests; such seeds which are not specified in Section 10 of this ordinance are considered as plant products.

POST-ENTRY QUARANTINE: Import of plants on condition that the Service approves the place and method of growing, keeps the plants under observation, and finally decides whether tha plants shall be destroyed or free distribution shall be permitted.

SERVICE: The Plant Protection Service of the Ministry of Agriculture of Israel, as represented by its chief and its inspectors.

Section 3. General Rule

Plants and plant products mentioned in this ordinance must not be introduced or admitted into Israel unless the provisions of the ordinance are fulfilled.

Section 4. Prohibition of Import

a) It is prohibited to import in this country any consignment infested with dangerous organisms. This provision shall apply even if it is permissible to import the consignment in question without Phytosanitary Certificate or permit. A list of organisms declared in particular to be dangerous is given as Schedule 1 to this ordinance.

b) It is further prohibited to import in this country:

Elm (Ulmus spp. and Zelkowa spp.): all species and varieties incl. seed, elm bark, unbarked and unstripped wood, on account of viroses,

Raspberry and blackberry (Rubus spp.): Plants of all species and varieties from North America, on account of viroses,

Oak (Quercus spp.): seed of all species, on account of Chalara quercina,

Rose (Rosa spp.): plants from Australia, New Zealand, Italy, and other countries where Rose wilt is established,

Stonefruit trees (Amygdalaceae): All plants from countries outside of Europe, all kinds of seed; Prunus americana and Prunus virginiana in all forms and from all origins, on account of viroses,

Strawberry (Fragaria spp.): plants of all species and varieties from North America, on account of viroses.

The Service may grant exemption from the prohibitions under b) when the origin is known to be free from the diseases indicated.

c) It is further forbidden to import in this country:

Barberry (Berberis spp.) all deciduous species and varieties, including grafted barberries and seed, and including Mahoberberis, on account of Puccinia graminis.

Chestnut (Castanea spp.): plants, seeds, and unbarked wood of all species from infested districts, on account of Endothia parasitica; also Castanea mollissima on account of Chalara quercina.

All plants which are listed in Schedule 2 as host plants of San José scale and which originate in an infested district.

Live insects and injurious organisms, including their eggs, larvae and pupae, also cultures of fungi and bacteria injurious to plants. This prohibition does not apply to bees.....

Mould, compost, animal manure, and ship's ballast, soil, vide Section 6c), 7c), 8d), and 8g).

Section 5. Import conditions

a) The plants dealt with in Section 6 to 13 may be imported in this country only on condition that they are accompanied by a Phytosanitary Certificate (vide Sect. 20), that the Service has issued a permit (vide Sect. 21) for the consignment in question, and that entry takes place through one of the following customs houses:

Haifa, Jaffa, Lydda, Tel-Aviv,

or such custom house as may be approved by the Service in special cases.

b) The Service may in conjuction with customs authorities permit plants in tight packages to be removed from the point of entrance to the point of destination, on condition that the consignment may be unpacked only in the presence of an inspector.

c) The Minister may modify the rules of this ordinance for occupiers having their dwelling close to the frontier.

d) Vegetables, fruit, etc., carried by ships and aeroplanes for the provision of passengers and crew shall not be considered as imported as long as they are not removed from the carrier.

e) Institutions and persons needing plants for research or plant breeding may arrange that necessary plants be directed to the Service which will, after customs clearance and inspection, forward them.

Section 6. Seed Potatoes

Seed potatoes may be imported only on the following conditions:

a) that the field from which the potatoes originate had been submitted to at least two field inspections and found free from potato wart, Colorado beetle, and viroses (vide Schedule 1): substantially free from other diseases and pests; and by proper sampling and analysis found free from potato root nematode;

b) that the origin is free from potato wart, Colorado beetle, and Japanese beetle, (vide Section 2);

c) that the consignment at inspection before dispatch is found free from visible dangerous diseases and pests (vide Schedule 1), substantially free from other attacks, and practically free from soil;

d) that the potatoes are packed in new, unused sacks or boxes and that each container is closed with the seal of the Service;

Section 7. Table potatoes

Table potatoes may be imported only on the following conditions:

a) that the consignment is graded and packed, but in a special grading depot or at the harbor, not at the place of growth;
b) - c) - d) as in Section 6.

Section 8. Nursery Stock

Trees, shrubs, and other nursery stock, including grafts, budwood, cuttings, etc. (vide Section 2) and any such material which may be used for vegetative propagation may be imported only on the following conditions:

a) that the plants have been subjected to field inspection in the season prior to dispatch, at which inspection the plants shall have been found free from dangerous pests and diseases (vide Schedule 1) and substantially free from other injurious attacks;

b) that the origin is free from potato wart, Colorado beetle, Sano José scale, Japanese beetle, and woolly aphis (cf. Sect. 2.);

c) that the nursery is found to be by proper sampling and analysis free from potato root nematode;

d) that the consignment at inspection before dispatch is found free from visible dangerous diseases and pests, substantially free from other visible diseases and pests, and practically free from soil;

e) that plants regarded as host plants for San José scale (vide Schedule 2), although from an origin free from this pest, are disinfected (fumigated) at the risk and expense of the occupier, and according to a prescription approved by the Service. The Service may declare a fumigation, specified in the Phytosanitary Certificate, to be satisfactory, and the Service may, in special cases, grant exemption from fumigation for plants sensitive to disinfection;

f) that plants not listed in Schedule 2, but from an origin infested by San José sclae, are submitted to a disinfection approved by the Service, which may grant exemption for Conifers and other Gymnosperms, and for plants sensitive to disinfection;

g) that plants with earth-balled roots and bedding-out plants may be imported provided special agreements on the question of disinfection, or other precautions have been made with the Service.

Section 9. Flower bulbs

Flower bulbs, including corms and tubers, may be imported only on the following conditions:

a) that the origin is a field which is inspected as described in Section 8a);

b) that the field is found by proper sampling and analysis to be free from potato root nematode;

c) that the origin is free from potato wart;

d) that the consignment is inspected prior to dispatch and found free from visible dangerous diseases and pests, substantially free from other diseases and pests, and practically free from soil;

e) that the consignment is packed in new, unused bags or boxes; passenger luggage,(vide Section 14).

Section 10. - Seeds

Seeds of the categories named below may be imported only on the conditions indicated:

a) that the field where the seed is produced has been inspected and found free from the diseases specified below:

Barley seed for sowing: Barley stripe mosaic;

Bean seed: Bacterial wilt (Corynebacterium flaccumfaciens) and common bean blight (Xanthomonas phaseoli);

Lettuce seed: Lettuce mosaic;

Pea seed for sowing: Bacterial blight (Pseudomonas pisi);

Pecan seed: Virus diseases;

Tomato seed: Bacterial canker (Corynebacterium michiganense) and Bacterial spot (Xanthomonas vesicatoria).

For countries which are found free from the diseases mentioned under a) an additional declaration on the Phytosanitary Certificate confirming this fact, may supersede field inspection.

b) that the seed is examined prior to dispatch and found free from the diseases specified:

Flax seed for sowing: Pasmo (Mycosphaerella linorum);

Ryegrass seed: Blind seed (Ciboria temulenta);

Wheat for sowing: Flag smut (Urocystis tritici).

c) Cotton seed: that the seed is fumigated against Pink bollworm (Platyedra gossypiella). The Service may also order disinfection against the bacterium Xanthomonas malvacearum and the fungus Nematospora gossyppii.

Section 11. Fresh fruit

Fresh fruit of the following categories may be imported only if the consignment has been inspected prior to dispatch and found free from any dangerous disease or pest (vide Schedule 1):

Apples and pears;

Bananas;

Cherries, plums, and other stone fruits (Amygdalaceae);

Citrus fruits;

Passenger luggage, (vide Section 14).

Section 12. Vegetables

Vegetables of the following categories may be imported only if the consignment has been inspected and found free from any dangerous disease or pest (vide Schedule 1), substantially free from other attacks, and practically free from soil:

Beans;

Cauliflower;

Lettuce;

Melons;

Onions;

Tomatoes;

All kind of vegetables with roots;

Passenger luggage, (vide Section 14).

Section 13. Cut flowers

Cut flowers, including shoots and branches for decoration purposes, may only be imported if the consignment has been inspected prior to dispatch and found free from dangerous diseases and pests (vide Schedule 1).

Countries free from dangerous diseases and pests generally connected with certain categories of flowers may obtain from the Service permission to export such flowers to Israel without certificate and permit, on condition that packages are marked with a special tag, stating that the locality of origin is inspected frequently.

Section 14. Passengers' luggage

Plants and plant parts in passengers' luggage are not exempt from the rules of this ordinance. The Service may, however, permit non-commercial import of small quantities, especially of cut flowers, even without Phytosanitary Certificate.

Inspection, if any, shall take place during customs clearance of the luggage and the permit be given orally. The Service may, however, retain any plant material for thorough inspection and later decision on import, disinfection, or destruction of the material.

Section 15. Import without Phytosanitary Certificate

Fresh fruit and vegetables of categories not mentioned in Section 11-12 may be imported without certificate. The Service may, in conjunction with customs authorities, simplify the rules of permit.

Section 16. Import without either Phytosanitary Certificate or Permit

The following categories may be imported without certificate or permit:

Seeds not mentioned Section 4 and 10;

Nuts, walnuts, and similar dry fruits;

Prunes, raisins and other dried fruits for consumption.

Section 17. Packing material

a) Hay, straw, grass, potato-haulm, and used sacks must not be employed as packing for plants imported into this country. On the other hand, it is permitted to use, for example, sphagnum and other mosses, sawdust and wood shavings, hemp-husk, raw cellulose, corrugated cardboard, seaweed, reeds and rushes (Phragmites, Juncus, Scirpus). Ships dunnage containing straw, etc., may be landed if burned up in port under supervision of the Service.

b) Parcels containing plants imported into this country must each bear a label stating the contents and distinctive number of the certificate, if any. The parcels must be of suitable dimensions, so that the inspection and disinfection of the contents can be carried out without difficulty.

c) Plants imported into this country must be as free of earth or soil as possible, (vide, however, Section 8g).

Section 18. Rejection

a) When, on inspection, any imported plants are not found to be free from dangerous diseases and pests, or not substantially free from injurious diseases and pests, notice shall be given to the occupier whereupon such plants, including packing material or containers shall - at the risk and expense of the occupier - be destroyed, re-exported or treated as ordered by the Service. For vehicles and other carriers the Service may order disinfection. The Service of Israel shall immediately inform the Service of the exporting country of the infestation found and of the measures taken.

b) Should a consignment fail to comply with the provisions laid down in this Ordinance, should the requisite certificate or invoice be lacking or the certificate be inadequately drawn up, or the consignment include plants other than those entered on the certificate or invoice, the Service may, in exceptional cases, permit the import of the said consignment into this country, provided that the defects can be remedied by disinfection, post-entry quarantine or in some other way known to the Service to be effective.

Section 19. Disinfection and Pest-Entry Quarantine

As a safeguard against diseases and pests which cannot, owing to their nature (for example, virus diseases), always be discovered during in-port inspection, the Service may order plants to be disinfected (fumigated) or to be placed in post-entry quarantine, (vide Section 2).

Section 20. Phytosanitary Certification

a) Phytosanitary Certificates shall be issued by an official Plant Protection Service in the country of origin, and shall be in the form laid down in the International Plant Protection Convention (Rome, 1951). The certificate shall be written in the language of the country of export and in English, French, or German.

b) The original certificate shall accompany the waybill, bill of lading and other documents concerning the consignment.

c) The certificate shall include information re origin of the plants (vide Section 2) and a description of the consignment. A copy of the consignor's invoice, stamped, signed, and attached to the Certificate by the Service of the exporting country, constitutes a valid description.

d) The certificate must contain adequate information, and any corrections must appear above the signature of an official of the Service concerned.

e) Should certificates for Plant Products be required, the form of Certificate described above may be used, with such additional declarations as may be necessary in order to modify the statements printed in the form.

f) The examination of the consignment carried out with a view to the issue of the Certificate shall have been made within 14 days prior to the dispatch of the consignment from the locality of origin or the grading depot.

Section 21. Permit

a) In order to obtain from the Service the permit dealt with in Section 5, the occupier shall submit an application in duplicate. The application may be submitted up to 3 months before the expected date of import, in order to enable the Service to advise the applicant in cases of an extraordinary nature. If the application is submitted shortly before the arrival of the consignment a copy of the Certificate may be attached to the application in order to facilitate matters.

b) When, after inspection, the Service decides that import can take place, a permit is delivered to the occupier for presentation to the customs authorities.

c) The customs authorities may admit plants to import only when Certificate and Permit are presented to them, with the exception of the cases mentioned in Sections 14, 15 and 16. The Customs shall retain Certificates and Permits and hand them over to the Service.

Section 22. Financial responsibility

The issue of a permit in pursuance of this Ordinance, and any inspection carried out by the Service, cannot with legal effect be set up by any party as a guarantee in a lawsuit, as the Service does not accept any financial responsibility towards the occupiers, the growers, or the foreign selllers in connection with the inspection.

These rules also apply to measures in connection with post-entry quarantine.

Section 23.

Fees, if any.

Section 24.

Violations, reference to the Plant Protection Act.

Section 25.

Coming into force - revocation.

Section 26.

Amendments.

APPENDIX C

DRAFT 3 ORDINANCE PROHIBITING GROWING OF CERTAIN BARBERRIES AND BUCKTHORN

In pursuance of the Plant Protection Act of ..... the following provisions are laid down in order to decrease the danger of rust attacking cereals and grasses.

Section 1

The cultivation, sale, offering for sale and other distribution of all deciduous species and varieties of Barberry (Berberis spp.), of Mahoberberis, and of Buckthorn (Rhamnus spp.) is forbidden.

Section 2

Concerning prohibition of import of Berberis, Mahaberberis and Rhamnus, including seeds, and inspections and survey of illegally imported plants, see the Plant Import Ordinance, Section.....

Section 3

If Barberry or Buckthorn bushes growing in the country are found to be or suspected of spreading rust (the Arbitration courts established by Ordinance of..... shall judge cases raised by private persons or by official institutions. Arbitration courts and) the Plant Protection Service may advise and the Minister will then decide that eradication of Barberries and Buckthorns shall be carried out or directed by the State, see the Plant Protection Act, Article.....

Section 4

Permission to cultivate plants otherwise prohibited by this ordinance can be granted to scientific institutions by the Minister of Agriculture (if the Plant Protection Board so recommends).

APPENDIX D

DRAFT ORDINANCE CONCERNING PLANT PROTECTION ARBITRATION

In pursuance of the Plant Protection Act of ..... the following provisions are laid down:

Section 1.

The Minister of Agriculture will name for every district of Israel a senior arbiter and a number of arbiters to function for a period of 5 years as a rule. Every arbiter shall sign a statement to the Minister, promising to carry out his task in honesty. The Minister will deliver to every senior arbiter a register in which should be recorded all complaints and decisions.

Section 2.

Any grower who finds that serious plant diseases, pests, or weeds are spreading or threaten to spread from other premises to his own crops, or that plants on other premises threaten to injure by cross-fertilization crops cultivated by him for production of seeds, may deliver a written complaint to the senior arbiter in that district in which the suspected plants are growing.

Section 3.

The senior arbiter shall without delay survey the case and have sufficient material collected for correct determination of the cause of injury. The arbiter may call in to his assistance specialists in plant protection or plant breeding. If at this stage the arbiter finds that the case does not fall under this ordinance or that the parties can come to an agreement, he may close the case registering it as rejected or as closed by agreement. If not, the senior shall

a) call in two other arbiters who, with him, shall constitute the court, electing those whom he finds best qualified for the case and not related to any of the parties;

b) decide date and place for session of the court;

c) state the content of the complaint to the defendant; and

d) summon both parties to meet and give evidence before the court.

Section 4.

The arbiters may reject the complaint

a) if the complainer does not appear before the court;

b) if the complaint is produced inordinately late according to the circumstances of the case;

c) if the case is of a nature so serious that the arbiters find it should be the object of public prosecution and decide to hand over the evidence to the Minister of Agriculture.

Section 5.

The arbiters may decide

a) that a compensation shall be given in money or in kind; the arbiters may defer settling of the exact amount until they have sufficient information on the actual loss of crop and of the market value of the product lost;

b) that in order to prevent cross-fertilization a crop shall be ploughed down before a fixed term, or in another way rendered harmless, taking regard to value according to area and nature of the crops, and to which party first began seed production;

c) that in order to prevent serious spread of diseases, pests, or weeds reasonable measures should be carried out before a term stated;

d) that a sum equalling the costs in the case shall be paid to the Ministry of Agriculture by one or both of the parties;

e) whether, in case one of the parties in writing to the senior arbiter affects the impartiality of an arbiter, the arbiter in question shall cede or else retain his post.

Section 6.

The decision of the arbitration court is made by vote; the senior arbiter shall have a deliberative and a casting vote. The decision shall without delay be communicated to the parties and to the Minister of Agriculture. In case of dissenting votes an arbiter is entitled to have his responsum rendered in the record and appended to the decision as communicated to the Minister.

The Minister may publish one or several decisions or responsums for information and guidance.

Section 7.

Within 8 days after the date of the decision a party may deliver to the senior arbiter an appeal which shall be forwarded without delay to the Minister of Agriculture. The Minister may on such appeal or on his own initiative decide to

a) confirm a decision;

b) refer a decision to revision by an arbitration court of another district;

c) refer a decision to revision at a superior court.

Section 8.

In case a party has not delivered appeal as prescribed in Section 7 and, still, does not within the term settled comply with the decision of an arbitration court, the other party may notify the senior arbiter, who shall without delay present the case to the Plant Protection Service. The Service may then proceed according to the Plant Protection Act, Article VIII.3.

APPENDIX E

DRAFT ORDINANCE CONCERNING THE INSPECTION OF PLANTS INTENDED FOR PLANTING AND PROPAGATION

In pursuance of the Plant Protection Act of..... the following provisions are laid down:

Section 1. Title

This ordinance may be cited as the Plant Inspection Ordinance.

Section 2. Definitions

(the same as in the Plant Import Ordinance) plus:

SALE: Any offer for sale, any sale or other way of distribution for further cultivation or propagation.

CONSIGNMENT INSPECTION: An examination of plants shortly before sale or distribution.

Section 3. Scope

This ordinance comprises inspection of all living plants produced in this country for sale, for planting and propagation, except seeds and seed potatoes. The Plant Protection Board may exempt certain plants from inspection.

Section 4. Application

Every occupier producing plants for sale shall every year before..... apply to the Plant Protection Service for inspection, using a form delivered by the Service.

Section 5. Field inspection

The field inspection shall ensure that the plants, as regards health and quality, fulfil all the requirements made for a guaranteed commodity.

It is the duty of the occupier:

1. to give the inspector all information which is necessary to carry out the inspection;

2. to see that all plants comprised in this ordinance are properly shown to the inspector;

3. to inform the inspector of the incidence of all injurious attacks. The grower may remove diseased or other plants before inspection, on condition that the inspector is informed.

Tolerances for presence of essential attacks shall be fixed by the Plant Protection Board in rules of inspection. Due regard must be taken to requirements of importing countries.

Cultures, from which a limited number of plants attacked by viroses or other injurious attacks can be removed, or in which injurious attacks can be controlled by a treatment prescribed by the inspector, may be held pending a renewed inspection.

Such plants as are found to be free from injurious pests and diseases or which are only slightly infested by unessential attacks, may be approved at the final field inspection.

Cultures shall be rejected if

1. injurious attacks are not controlled;

2. not rogued to such an extent that they meet the fixed tolerances;

3. they may convey attacks to other plants;

4. health conditions cannot be ascertained due to deficient cultivation or growth conditions.

Rejected plants shall be destroyed in the way prescribed by the inspector unless the occupier obtains from the Plant Protection Service a written permit to keep the plants. Special treatment, including isolation, may be prescribed as a condition for such permit.

Any sale of rejected plants shall be deemed fraudulent.

Section 6. Consignment inspection

All plants intended for export shall be inspected shortly before shipment. It is the occupiers duty to apply to the Plant Protection Service for inspection at least 4 days before inspection shall take place, using a form obtained from the Plant Protection Service.

It shall be considered fraudulent to offer for consignment inspection any plants rejected at field inspection.

Consignment inspection shall be carried out, according to rules prescribed by the Plant Protection Board, in such a way that the plants and packing material fulfil the requirements of the importing countries. The rules may prescribe fumigation or other disinfection.

It is incumbent upon the occupier to place the necessary room and assistance at the inspector's disposal.

The Minister may prescribe that consignment inspection of certain plants shall take place also before sale inside the country.

Section 7. Appeal

An occupier may appeal against a rejection, provided this is done in writing to the Plant Protection Service within 4 days after the rejection. The case shall, without dolay, be investigated by

the Director of the Plant Protection Service or his deputy and a member of the Plant Protection Board previously delegated for this task by the Minister. These two men may decide the case or refer the final decision to the Plant Protection Board.

Together with the appeal an amount of £..... must be deposited with the Service, which amount is forfeited if the rejection is upheld. The costs of the investigation are carried by the Service.

Section 8. Certificates

If the Plant Protection Service decides that the consignment fulfils the prescribed requirements and also the special demands which may be made by the importing country, the Service will draw up a certificate of health on forms to be fixed by the Service with a view to the regulations of the importing country; this certificate, together with the requisite number of copies, will be sent to the exporter. A completed and attested duplicate of the invoice, which must be signed by the inspector, must be attached to the certificate of health. An attested copy of the original invoice may take the place of the duplicate and need not contain information regarding prices.

To expedite inspection in the importing country the Service may send copies of the certificate and invoice direct to the Plant Inspection Service of the importing country.

The Service may, at any time, demand the original invoice to be laid before them.

In the case of plants and plant products exported for purposes other than propagation, the Plant Protection Service may, on the request of the exporter, undertake such examinations regarding the health of the produce as the Service deem necessary to warrant them in issuing a certificate in compliance with the health regulations of the importing country.

The Service may, on application from the occupier, issue certificates also for plants not intended for export.

Section 9. Plants for Propagation

The Plant Protection Board may lay down that healthy parent plants (pedigree) shall be selected for rootstock, cuttings, budwood and other stock for propagation, and prescribe rules for the methods used in such selection work.

Section 10. Designations

The Plant Protection Board may fix special designations and labels for healthy parent material (pedigree), for plants originating directly from such material (elite), and for plants approved by the usual field and consignment inspection.

Use of such designations and labels for material not approved in the category indicated shall be deemed unlawful (considered as fraud).

The designations may be reproduced in catalogues, circulars and other advertizing material on condition that no misconception or confusion is created by such use, and that copies of such catalogues, etc. are sent to the Service. The inspections may not be used for advertizing in any other way.

Section 11. Transfer Notes

If necessary in order to fulfil requirements of importing countries, or if desirable from other causes, the Plant Protection Board may prescribe that approved plants, transferred from one occupier to another, shall be accompanied by a transfer note indicating the origin and the number and species (variety) of the plants.

The same rule applies to imported plants which must not be re-exported unless in direct transit or unless they have been grown in Israel for 2 full seasons.

Section 12. Financial responsibility

The issue of a certificate and approval by field and consignment inspection in pursuance of the provisions of this Order shall be without prejudice to the State, and cannot be set up as a guarantee in private

litigation, as the Plant Protection Service does not accept any financial responsibility towards growers, exporters, sellers or buyers in connection with the control.

Section 13. Fees

The Service or Board with the approval of the Minister of Agriculture is entitled to fix fees for inspection, certificates and designation labels.

Section 14. Violations

Section 15. Coming into force

Section 16. Amendments

APPENDIX F

DRAFT ORDINATION CONCERNING CONTROL OF POTATO ROOT NEMATODE

In pursuance of the Plant Protection Act of..... the following provisions are laid down:

Section 1. Notification

It is ordered that occupiers of fields and gardens in which it is suspected or has been ascertained that potato or tomato plants have been attacked by potato root nematodes (*Heterodera rostochiensis*) must immediately notify the local Police or the Plant Protection Service. If the local Police is notified such information shall immediately be passed on to the Service.

The Plant Protection Service is at any time entitled to enter areas which are suspected of being or known to be infested, as well as to enter adjoining areas and to enter store rooms on said areas. The Service may also establish small potato plots in order to investigate the possibility of infestation in such areas.

The Service is entitled to take samples of soil and roots for investigation for nematodes in all areas.

Section 2. Local quarantine

Potatoes produced in infested areas must neither be sold nor used as *seed potatoes*.

Where attacks of potato nematodes are found the Service may establish protective zones and prohibit or limit the cultivation of potatoes or tomatoes in such zones.

The Service may prohibit the removal of potatoes, nursery stock, plants for transplanting, and other plants and parts of plants with adhering soil, manure, compost, refuse, and soil from localities in which potato root nematodes are found.

The Service may grant exemption from or revoke its orders on certain conditions, e.g., where suitable soil disinfection is undertaken, or when analyses prove an area to be free from cysts of potato root nematodes.

Section 3. Prohibition of Potato-growing

It is forbidden to cultivate or to clamp potatoes in nurseries and other premises where plants are grown for sale or other distribution.

Section 4. Responsibility

Anybody selling, renting or in other way handing over infested areas for cultivation must inform the receiver of the infestation.

Section 5. Local Surveys

Any grower of plants for sale or other distribution and any organization of such growers may demand from the Plant Protection Service that premises belonging to the grower (or growers) and surrounding premises be examined for nematode attacks and soil samples taken for analysis for cysts of potato root nematodes.

The Minister is entitled to fix a fee for each sample analyzed on application; samples taken outside the applicants' premises may be exempt.

Section 6. Violations

Section 7. Coming into force

Section 8. Amendments

APPENDIX G

DRAFT PESTICIDE REGULATIONS 1956

In pursuance of the Plant Protection Order section 13 the following rules are laid down:

1. Definitions

PESTICIDE: Any chemical substance or mixture of chemicals (with the exception of raw products and technical substances) for control or destruction of weeds, fungi, insects, and other animal life, such as herbicides, fungicides, insecticides, acaricides, and rodenticides, together with all kinds of substances used as adjuvants.

TECHNICAL SUBSTANCE: Every substance incorporated in the pesticide, including active ingredients.

ACTIVE INGREDIENT: Any compound incorporated in the pesticide which will in itself, when used in a sufficient quantity, kill(or repel) weeds, fungi, insects, etc.

PACKING MATERIAL: Material used for making containers (glass, iron, etc.) for the pesticides.

PRODUCER: Any person producing pesticides from inland or abroad.

DIRECTOR: The director of the Division of Plant Protection.

2. Application

a) Any producer or importer wanting to bring technical substances on the market must apply for a license for this substance and produce a sample for analysis.

b) Any producer wanting to sell a pesticide imported or manufactured by himself must submit to the director an application for analysis and for approval to sell the pesticide (registration).

c) The application must be submitted for each pesticide separately and must be accompanied by samples as requested by the director.

3. Particulars of Application

The application for registration of a pesticide must be written on a form obtained from the director and containing the following information:

(1) The compound in general:

a) name and address of the producer;

b) name and address of manufacturer;

c) coined name (trade name) of the pesticide;

d) purpose of the pesticide;

e) chemical composition of all active ingredients;

f) total percentage of inert and synergistic ingredients; if synergists are active by themselves, they must be declared as active ingredients;

g) percentage of each active ingredient in weight if sold in dry state, in volume if sold as a liquid;

h) particle size if the compound is intended for spraying or dusting;

i) specific gravity in kg. per liter;

j) whether or not the pesticide is corrosive;

k) whether or not the pesticide is inflammable;

l) information concerning stability of the pesticide;

m) information concerning danger of poisoning or other injury.

(2) Particulars about the active ingredients of the pesticide:

a) chemical name and formula;

b) name and address of manufacturer and producer;

c) boiling and melting point;

d) specific gravity;

e) degree of purity.

(3) Particulars concerning packing material, kind of material, outside dimensions

4. Particulars of the labelling (which must be in Hebrew) of the packages

Such items named above under 3.(1) a) to g) and furthermore:

a) Weight or volume of the pesticide;

b) Purpose and instructions for use:

(i) particulars concerning which diseases, insects, etc. the pesticide is claimed to control;

(ii) name of plants on which the pesticide is to be used;

(iii) quantity of substance or pesticide to be used against the different attacks and on the respective plants;

(iv) direction for preparation of the solution if the pesticide is to be prepared as a spray;

(v) special instruction about influence of temperature, compatibility, and corrosiveness.

c) If the pesticide is covered by these regulations, the number of the certificate issued must be given on the label.

d) Necessary warnings (cautions) and indications of antidotes and first-aid.

5. Examination of a pesticide

a) The director will distribute to his officials samples for chemical analysis and field experiments.

b) The director can consent to exempt a pesticide from chemical analysis and/or field experiments.

6. Payment for Analysis

The director will in every case fix a fee for analysis, depending on the nature of the pesticide, origin, and whether used in bulk or in minute quantities, the minimum fee being I£75 and the maximum I£750.

7. Refusal of Registration

The director can refuse to register a pesticide if the chemical analysis proves that it will not be fit for the purpose indicated.

8. Notices

To a producer who has submitted an application for registration of a pesticide the director will send notice about registration or also refusal within the following periods, counted from the day of application:

a) if exempted from chemical analysis and field experiments: 30 days;

b) if exempted from field experiments: 3 months;

c) in all other cases: 2 years.

9. Appeal against Refusal of Registration

a) A producer who has received refusal to register a pesticide may within 30 days from the date of notice submit an appeal to a committee of three appointed by the Minister of Agriculture who will also designate one of the members to be the chairman.

b) The committee will itself decide on its meetings and work and will take decision according to vote.

10. Approval of Packing and Label

a) (1) Together with the registration of the pesticide the director will approve of the packing or refuse approval if the packing is not satisfactory to protect the pesticide from deteriorating or oozing out.

(2) The director may approve of the label but is, nevertheless, entitled to order corrections

to be made in the text according to Sections 3-4 of this regulation, in which case he will give notice of his decision as in Section 7.

b) A refusal of the director to approve of a packing may be appealed against in the same way as described in Section 9.

11. Certificates

a) Registration of a pesticide will be communicated to the applicant in the form of a registration certificate which will comprise approval of packing and labelling.

b) The director will keep a register containing copies of the certificates.

c) Decisions to make certificates void (vide Section 12) will be entered in the register.

12. Validity and Expiration of Certificates

a) Any certificate is automatically void 3 years after the date on which issued.

b) The director may at any time recall a certificate if upon use of the pesticide facts hitherto unknown prove it unfit for its purpose or injurious to plants or livestock. In recalling a certificate the procedure should be as at a refusal to register (vide Sections 7 and 8 of this Regulation).

13. Additional Types of Packages

a) A producer may at any time apply to the director for approval of other types of packing.

b) Instructions on the new packages shall be as on the original (vide Sections 3 and 4).

c) New types of packages will be entered in the certificate.

14. Producer's Sale of a Pesticide

A producer must not sell a pesticide, whether manufactured by himself or imported, if the pesticide or packing does not correspond to the wording of the certificate,(cf. Section 11), and is not provided with the approved label.

15. License to Retail Sale of a Pesticide

a) It is forbidden to sell pesticides without a license.

b) The director decides whether he will issue a desired license, refuse it, or defer his decision.

c) This section does not concern the producer's sale of his own pesticides.

16. Sale of Pesticides in Original Packing

a) Pesticides must be sold in original packings and only when packings are labelled as prescribed in Sections 3 and 4.

b) A producer is allowed to sell his pesticide in bulk to a packer who is then responsible for proper packing and labelling.

17. Authority of Plant Inspectors

A plant inspector is entitled to enter any premises in which pesticides are produced, stored, or sold, in order to inspect any pesticide found, to take samples for analysis, and to seize any pesticide violating these regulations.

18. Sale for Experimental Purpose

The director may permit sale of unregistered pesticides for solely experimental purposes.

19. Cancelling

The Ordinance of Plant Protection, Pesticides, of / 19..., shall be cancelled at the same time as these regulations enter into force.

20. Coming into Force

These regulations come into force on the thirtieth day after their publication in the official Gazette.

21. Name

These regulations may be cited as Pesticide Regulations 1956.

22. Amendments

APPENDIX H

SCHEDULE OF PLANT PROTECTION WORK AND RELATED RESEARCH IN ISRAEL

I. Enforcement of Regulations (Supervision, Inspection, Public Control)

Section Inspection

Import Inspection:	Ports, airports (in future: frontier entrances)
	Post-entry quarantine (2 quarantine gardens in different climates, 1 greenhouse)
	Pre-entry quarantine (station in common for Mediterranean states)
	Point-of-origin inspection for special cases of gross import.
Field Inspection:	Nursery stock for general distribution and export
	Flower bulbs etc.
	Pedigree (elite) inspection of healthy mother-plants
	Production of healthy seed
	Control fields (check on inspection)
Post-harvest inspection:	Delegated to the seed-testing laboratory
Consignment (pre-shipment) inspection:	as required for export and to some extent in the country as well
	Nurseries (Crowngall, scale insects, weed runners)
	Bulbs (Fungi, nematodes)
	Fruits, vegetables (pests, diseases, and grading)

Section Documentation

Keeping up-to-date information, regarding import requirements and incidence of pests and diseases in other countries.

Determination of intercepted pests and diseases.

Assembling of collection for inspectors' study.

Courses for new inspectors, refresher courses.

Section Pesticides

Registration, approval, chemical analysis.

(Weed-killers and treatment of stores products included).

Laboratory assays.

Field experiments.

Supervision of retail trade (analysis of samples).

Advice to and co-operation with extension and research:

(Rehovot/Beit Dagon Station may take over some experiments for the section, especially in connection with general control problems, but the pesticide trade should always be referred to the section.)

Section Public Control

1. Locust campaigns
2. Rodent control
3. Potato root nematode control (local quarantine)
4. Eradication of Berberis, Rhamnus, and other sources of infection.

The activities scheduled under I, may include occasional short-term research, but research should not be a main object.

II. Extension (Advisory or consultatory work)

Until the 12 district extension offices planned by the Ministry of Agriculture can be realized:

1 central extension office (at least 4 trained men)

1 northern - - - 2 -

1 southern - - - 2 -

Special tasks of the central office: Preparation of leaflets, demonstration material, courses. If necessary appropriation and staff can be secured: Survey, estimation of losses, warning services.

The activities scheduled under II may include occasional short-term research, but research will never be a main object.

III. Research (Investigations in biology, ecology, taxonomy, with laboratories, greenhouses and experimental fields at disposal

Biological and ecological problems. Development of disease-resistant varieties.

Experiments may well be instigated by problems found important by extension and inspection workers and the research staff should be available for consultations by extension men and inspectors on difficult questions that arise.

Monthly Meetings (or at least 8 or 10 meetings during a year) of the triangle Research-Extension-Inspection should be made a rule.

First part of meetings (Leaders of departments and sections):

Discussion of reports (also monthly pest and disease reports)

- - plans for research and experiments, control and inspection

Agreement on advice to the public

Second part of meetings (staff):

Short papers on results and observation, and oral news letter discussions.